

New Claims

1. An apparatus for measuring parameters of human feet for the purpose of determining the appropriate shoe size for said feet, said apparatus comprising:

- 5 (a) a base, which supports the components of said apparatus that are necessary to carry out the measurements and comprises a depression in its upper surface into which said feet are placed when said measurements are carried out;
- 10 (b) a cover, which fits over said base to protect said components, said cover comprising an open area in its interior that essentially matches the shape and dimensions of said depression in the upper surface of said base, internal walls, and a bridge element all of which, together with said depression in the upper surface of said base, define the borders of two essentially rectangular wells into which said feet to be measured are
- 15 inserted in order to carry out said measurements;
- (c) a pressure pad comprised of a matrix of pressure sensors that covers the floor of said wells;
- 20 (d) two stepping motors, each of which, when activated, causes a pair of endless belts to move, wherein one end of the first of said belts is fitted over a first pulley located on the shaft projecting out from a first side of said motor and one end of the second of said belts is fitted over a second pulley located on said shaft projecting out from the opposite side of said motor;
- 25 (e) a light source/detector pair attached to each of said pairs of endless belts, wherein one member of each of said light source/detector pair is attached

to said first belt and the other member of said light source/detector pair is attached to said second belt;

(f) control means, which controls the activation of said stepping motors;

(g) counting means, which count the steps of the rotation of said shafts of said stepping motors;

(h) memory means, which store the results of said counting; the signals from said pressure sensors; and, optionally, other information required for the determination of said parameters;

(i) computational means, comprising software for computing the length and width of each of said feet from the data supplied by said counting means and for determining diagnostic information from said sensors in said pressure pad; and

(j) display means, which display said parameters and other pre-determined information;

wherein,

- each member of each of said light source/detector pair is attached to its respective belt such that proper optical alignment allowing the detector of each of said pairs to detect light emitted from the source of said pair is established and maintained when said belts move;

- activation of the first of said stepping motors causes the elements of the first of said light source/detector pairs to move, without disturbing said optical alignment, back and forth along lines that are essentially parallel to the longitudinal symmetry axis of said wells;

- activation of the second of said stepping motors causes the elements of the second of said light source/detector pairs to move, without disturbing said optical alignment, back and forth along lines essentially parallel to the transverse symmetry axis of said wells; and
 - 5 - said software in said computational means integrates the results of said computed length and width of the feet with said diagnostic information obtained from said pressure pad to determine the appropriate shoe size for each of said feet.
- 10 2. An apparatus according to claim 1, wherein the light sources are infrared emitting light emitting diodes.
3. An apparatus according to claim 1, wherein the detectors are infrared sensitive phototransistors.
- 15 4. An apparatus according to claim 1, wherein the belts are timing belts.
5. An apparatus according to claim 1, wherein the control means, counting means, memory means, computation means, and the display means are an integral part
- 20 of said apparatus.
6. An apparatus according to claim 1, wherein at least a part of the control means, counting means, memory means, computation means, and the display means are

provided by a separate computation unit that is not an integral part of said apparatus.

7. An apparatus according to claim 6, wherein the separate computation unit is a
5 personal computer.
8. A method for using the apparatus of claim 1 to measure the maximum length and width of the feet of a human and to determine the appropriate shoe size for said pair of feet, said method comprising the following steps:
10 (i) providing an apparatus as defined in claim 1;
(ii) placing the feet in the wells with the back of the heel of each foot pressed against the inner wall section of each of said wells and the interior side of each foot pressed against the side of the bridge;
(iii) pressing a start switch activating the sensors in the pressure pad and
15 initiating the measurement process;
(iv) activating the light source for making the length measurement;
(v) activating the control means to activate the first motor, thereby moving the light source/detector pair for making the length measurement;
20 (vi) activating the counting means and memory means, thereby counting and storing the number of steps of said first motor from the "home" position until the signal from said detector disappears as a result of the longest foot blocking the optical path and sending the data to the computing means;

- (vii) computing the length of the longest foot;
 - (viii) turning off the light source for making the length measurement;
 - (ix) activating the light source for making the width measurements;
 - (x) activating the second motor to move the light source/detector pair for
5 making the width measurements;
 - (xi) counting and storing the number of steps of said motor between the
first disappearance and first reappearance and between the second
disappearance and second reappearance of the signal from said detector
resulting from the feet blocking the optical path and sending the data to
10 the computing means;
 - (xii) computing the width of each foot;
 - (xiii) turning off the light source for making the width measurement;
 - (xiv) causing said motors to be activated moving the attached optical
elements until a limit switch is contacted stopping the motion at the
15 respective "home" position of each motor;
 - (xv) sending the signals from the sensors in said pad to the computing
means, combining them with the length and width measurements in order
to determine the most appropriate shoe size, and sending at least some of
this information to the display means; and
 - 20 (xvi) displaying the results of the measurements.
9. A method according to claim 8, wherein step (vii) and step (xii) are carried out
after step (xiv).

10. A method according to claim 8, wherein steps (iv) to (viii) are carried out simultaneously with steps (ix) to (xiii).

11. A method according to claim 8, wherein steps (ix) to (xiii) are carried out before
5 steps (iv) to (viii).

12. A method according to any of claims 8 to 11, wherein the start switch is located on the computation unit and all steps of said method after step (iii) are carried out automatically under control of said computation unit.

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